



ANNUAL REPORT 2017-18





Perennia Food and Agriculture Inc. is Nova Scotia's technical development agency for the agriculture and fisheries sectors. The programs, services and projects we offer and implement support the growth of these two sectors which are key provincial economic drivers and vital to the sustainability and growth of our rural and coastal communities.

MISSION

To help farmers, fishermen and food processors be prosperous and profitable



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MESSAGE FROM OUR CHAIR



This fiscal year, Perennia continued to strive toward fulfilling our mandate of working with industry and our partners to grow the province's agriculture and seafood sectors.

Our team and the work they do on a daily basis continues to impress me as our projects, services and program portfolio continues to grow. One of the programs we offer is the farm extension program. As a foundation for the company since 2001, this is a key resource for the province's farmers and this year, like most, was very busy with over 1,600 farm visits, over 100 workshop, field days, tours and presentations, more than 200 pieces of content, and 44 research trials.

Two key activity areas I want to highlight for us in 2017/18 were supporting growth in the grape and wine sectors, and further enhancing our capacity in seafood.

We completed the first year of a three-year terroir assessment for the grape sector. We continued to provide excellent service as a key provider of site assessments under the province's Vineyard Development and

Expansion Program. We added a wine quality specialist to our team as part of a unique partnership with Acadia University's aLab, and we undertook three key projects: the development of a mobile bottling unit for the sector to have a local mobile bottling source for still wine; the initial steps toward the development of a quality wine standard for the province; and foundation work for a new virus testing plant health lab in collaboration with Agriculture and Agri-Food Canada.

Our first dedicated seafood position was created this year, which supported progress on a number of key projects including an industry program for the new provincial seafood brand. In concert with our quality and food safety and product development teams, work was completed on a Nova Scotia/China lobster quality standard program, food safety training was held where 27 per cent of participants were from seafood companies, and product development and improvements were done with seafood clients. A great deal of time this year was also spent on developing and writing a proposal for the federal/provincial Atlantic Fisheries Fund focusing on quality and resource optimization to enhance profitability for the seafood sector.

We welcomed a number of new faces this year to support programs and other new projects, and recruited new staff to fill some vacancies in our team when some staff moved on to new opportunities or retirement. A major initiative for the board was the recruitment of a new Chief Executive Officer, which concluded in March 2018. We are confident we will be starting off 2018/19 in good hands with Dr. Viliam Zvalo as CEO and Lynne Godlien as Chief Operating Officer, who was our interim CEO this year and did an excellent job.

All of our team did a great job this year, and I want to personally thank each of them for their hard work. This report couldn't possibly document all the work we do, nor provide the depth of time and commitment that went into each project, initiative and program.

As we look toward 2018/19, the Board and team are very focused on utilizing our resources to have the highest possible impact on our client's profitability and the provincial economy. We are looking forward to continuing to do more work and having even more impact in the coming years.

A handwritten signature in dark ink, appearing to read 'C. Keddy'.

Charles Keddy
Chair, Perennia Food and Agriculture Board

2017/18 PERENNIA AT A GLANCE

THE TEAM

Professional Agrologists	15
Certified Crop Advisors	5
Nutrient Management Planners	3
Summer Students 2016	5
Staff with MSc or higher	20
Staff with BSc or equivalent	14

THE WORK

Farm Calls	1,617	
Workshops, field days, presentations, learning tours	112	audience total 6,233
Newsletters, blogs, factsheets, publications	219	
Research trials	44	
Food safety consulting projects	27	
Public food safety training sessions	6	audience total 63
Product and process development projects	50	
Nutritional labelling/regulatory projects	22	
Fulltime tenant spaces filled and serviced	10	
Analytical lab projects	55	
Shelf-Life Studies	20	
Social media posts	110	Facebook
	27	Instagram
	215	Twitter
Videos produced	4	

AUDITED FINANCIALS

Perennia's audited financial statements for 2017-2018 will be available at www.perennia.ca by **June 30, 2018**.

AGRICULTURE SERVICES



Perennia receives an annual grant from the Province of Nova Scotia to deliver a farm extension program to the farmers of Nova Scotia. The program allows Perennia to provide specialized production services that help farmers acquire the information and develop the skills needed to be successful. In addition to this work, we offer consulting services to producers, agribusinesses, industry associations and academic institutions, and undertake development projects to address industry opportunities and challenges.

Our Agriculture Services team has agrologists providing expertise and services to conventional and organic farm operations in dairy, beef, sheep, hog, poultry, eggs, mink, field crops, berry crops, vegetables, greenhouse, ornamentals, pest management, honey bees and pollination, and soils. This team supports the growth and development of Nova Scotia agriculture through the introduction of innovations or improvements that help increase production efficiencies, enhance competitiveness, reduce risk and create new opportunities.

Our 16 production specialists made over 1,600 individual farm visits across the province in 2017/18, not including email, text, phone and in-person interactions with farmers at public events. These farm calls and interactions were all done at no cost to the farm under the government-subsidized farm production extension program. The team also participated in or led over 100 public events and created over 200 communication pieces all directed at reducing risk, increasing efficiency or improving productivity on farm.

In 2017/18, Perennia played a lead role in a major initiative focused on the wild blueberry sector. Managing Wild Blueberries in a Low Cost Environment was an initiative resulting from the Wild Blueberry Producers Association of Nova Scotia's Sustainability Committee in response to a significant downturn in the industry. A series of talks, factsheets and tools were developed through 2017 aimed at helping growers think about managing their fields in a different way, and to minimize financial loss and optimize production on their better producing fields. It also involved collaborating with the Nova Scotia Department of Agriculture and Dr. Travis Essau at Dalhousie University's Agricultural Campus on two focused workshops where growers were guided through the use of his on-line cost of production tool. As a result, many growers made hard decisions and took under-producing fields or sections of fields out of production and looked at ways to manage productive fields in more efficient ways.

Perennia took a lead role with the Nova Scotia Poultry Emergency Response Plan Committee as chair. This committee is in place for emergency preparedness including disease and farm emergencies within the poultry industry. Perennia livestock specialists also worked with provincial cattle, sheep and pork associations and the Canadian Animal Health Coalition to develop a provincial preparedness plan for the livestock industry for a sector-wide emergency.

In 2017/18, Perennia worked with the hog industry and Nova Scotia Department of Agriculture to develop a plan for a federally-inspected hog abattoir to service the needs of Nova Scotia hog producers. Currently, Nova Scotia commercial hog producers are either sending their animals to provincially-inspected facilities (which limits the markets they can sell their products into) or are shipping live animals to Quebec or Ontario. This would potentially provide an opportunity for growth and development in the industry, plus provide increased stability regarding abattoir access.

Pests are a large concern in fruit crops, with significant time and effort spent by Perennia delivering timely and relevant information related to alerts and management of various pests, including but not limited to, Monilinia blight, strawberry aphids, and spotted wing drosophila. Perennia has been committed to delivering a strawberry aphid monitoring and virus testing program since a virus devastated the strawberry industry in 2012. A renewed contract with Horticulture Nova Scotia and Nova Scotia Department of Agriculture allowed Perennia to continue to deliver the program in strawberries, raspberries and blackberries in 2017, with a continuation of the program through 2021.

Perennia specialists continued to take a leading role in biosecurity awareness, promoting the adoption of biosecurity principles on Nova Scotia's farms under the Nova Scotia Biosecurity project. This program was funded under the federal/provincial cost-shared Growing Forward 2 program. In 2017/18, the project funded speakers and/or expenses for the following events: Mink Field Day, Poultry Cleaning and Disinfecting Workshop, Beekeeping Fall Information Meeting, Nosema Workshops, Small Fruit and Horticulture Twilight Meetings, Beef Care Workshops, Nova Scotia Mink Breeders Annual General Meeting and Small Scale Hog Production Workshop. Funds from this project also provided resources direct to farmers, such as biosecurity signage, small hive beetle posters, hand sanitizers, biosecurity supplies and kits, hand lenses for detection of pests and plant diseases, biosecurity guide booklets, berry scouting guides and horticulture biosecurity factsheets.

During summer 2017, Perennia wrapped up a three-year study on Nitrogen Fertilizer Timing on Winter Wheat. This trial compared March and April applications of nitrogen to April-only applications and included three different rates. This multi-site randomized trial showed that there was no difference when putting fertilizer on in March, and again in April, versus putting all of the fertilizer on in April. This is very

Perennia partnered with Food and Beverage Atlantic to host the Atlantic Food Summit 2017 in October 2017 in Truro. Over 100 leaders of food related businesses learned about Atlantic Canadian Food performance from the Conference Board of Canada and the New Retail Landscape from Peter Chapman of SKU Foods. The day included a lively panel discussion including panelists from Atlantic Canada Opportunities Agency, GE Barbour, Benjamin Bridge and the Food Island Partnership who all shared information on how their businesses adapted and changed to meet consumer demand and also their thoughts on other opportunities in the food sector.

significant because the higher rates applied in March do not produce increase returns to the producer and can also be detrimental to the environment. The results of this trial were shared in several newsletters, grower meetings and can be found on the Atlantic Grains Council and Perennia website.

A key initiative for Perennia in 2017/18 was a cross commodity initiative aimed at focusing more attention on effective pesticide application. The result of a demonstration trial was published in a factsheet that showed the impacts of nozzle type, boom height and spray volume on canopy penetration in wild blueberry. Seven in-field sprayer calibration and canopy penetration workshops were held in conjunction with the Wild Blueberry Producers Association of Nova Scotia twilight meetings, as well as in Cape Breton and the Annapolis Valley for vegetable, berry and field crop producers. The goal was to demonstrate how adjusting spray parameters can increase pesticide efficacy, reduce spray drift and make pesticide application more efficient.



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Perennia developed a new entrant website (nsnewfarmer.ca) to support outreach and training activities to improve the knowledge and skills of beginning and transitioning farmers. As such, the objective of this project was to develop pre-production content and associated reference material that will help new entrants develop a customized farm plan in a streamlined and step-by-step process. This initiative was funded by the Nova Scotia Department of Agriculture's ThinkFarm Program.

In the dairy sector, work continued on the Transition Cow Monitor (TCM), an invaluable data model which acts as an early warning system of potential metabolic disease in dairy cows. Collating different health scores on cows and inputting them into the program, TCM will then give an alert for cows needing attention, or that simply need to be monitored. It gives vital information on how animals are performing by the way they are being managed at that time – be it through feed, housing, climate, or management. More than 60 per cent of cows that are culled are as a result of the transition period and producers welcome the opportunity to help prevent these problems. TCM has been trialed on three farms over the last 12 months with great success, with new standard operating procedures being developed at these farms to help prevent the onset of early metabolic disease.



Milk quota was on the rise for all dairies in Nova Scotia through 2017, which presented the opportunity to help producers increase production efficiently. Consulting work continued with 18 dairy producers through the year, with meetings on a monthly basis to address individual needs and meet goals. Cost of production also continued as a major dairy project through 2017/18. Benchmarks on specific performance and costs were gathered each month from 22 farms across the province and were shared with other producers to show how and where efficiencies could be made. This information has been used in producer meetings in the Annapolis Valley and Truro areas and was well received.

In February 2018, Perennia undertook a bunker silo density survey. Attaining a high density in the silo is important for two primary reasons. First, and most importantly, density and dry matter content determine the porosity of the silage. Porosity, in turn, sets the rate at which air moves into the silo and subsequently the amount of spoilage which occurs during storage and feedout. Many dairy operations are now dependent on large custom harvesters, increasing their forage intake far beyond their packing capacity. Silo density is not something producers have the ability to measure on their own. The purpose of this study was to survey a number of producers to demonstrate the need for more packing capacity and see how widespread the problem may be. After surveying both corn and grass silage bunkers on 21 farms, just under half of the core samples came back below the target density, indicating the need for more packing capacity and better forage harvest management. The results of the survey were conveyed back to the participants, included in a winter newsletter and used in two grower presentations.

In 2017/18, Perennia partnered with Nova Scotia Business Inc. to bring the popular 'Think Export' program to the Annapolis Valley with a focus on the agri-food and beverage sectors. There were 15 participants who learned key aspects to consider when entering new markets. They learned about the benefits, hurdles and myths about exporting, about the characteristics of successful exporters and learned what assistance is available to become export-ready in the agri-food and beverage sectors.



The development and expansion of the province's wine sector was a major priority for Perennia in 2017/18.

- Perennia completed the first year of a three-year terroir study in different locations in Nova Scotia. The goal of the project is to evaluate which grape varieties are more suitable for our environmental conditions. With this project, Perennia will have more knowledge to provide the best recommendations for each grower, taking into account wine quality, which starts in the vineyard.
- Perennia hired a Wine Quality Specialist in collaboration with Acadia University targeted at helping wineries interpret their lab results from aLab at Acadia University. A unique collaboration between Acadia University and Perennia, this is a new position developed to help wineries improve their processes. Since the end of January 2018 specialist has collaborated with both institutions to collect information to enable the creation of service lines and factsheets/technical information for industry.
- Our team at the Innovation Centre managed the build of a mobile bottling line for still wines in preparation for deployment in spring/early summer 2018. This initiative means Nova Scotia's wineries now has a year-round readily accessible bottling service available to them.
- Perennia began work on evaluating and assessing the best path forward in relation to a quality standard system for Nova Scotia's wine sector and will be working with industry toward implementing a quality wine standard system in 2018/19.
- As part of the requirements for accessing funding under the Vineyard Development and Expansion Program, the Nova Scotia Department of Agriculture requires all new properties be assessed for agronomic potential for grape production. Site assessments include detailed GIS property maps, soil classification, drainage, fertility, climate limitations, and varietal recommendations based on the site. Partial assessments are also conducted on existing vineyard properties looking to expand. Under the Vineyard Expansion Program in 2017, Perennia's horticulturist and soil specialist completed 11 full site assessments (new properties) and six partial site assessments (existing vineyards).
- The Nova Scotia Federation of Agriculture produced a risk assessment tool focusing on Nova Scotia's grape and wine industry to assess current and future/projected risks associated with climate change and the changing socio-economic landscape in Nova Scotia. The tool will help grape growers and wineries evaluate different environmental and socioeconomic risk scenarios and test out various mitigation strategies. Perennia has been involved since the inception of the project to provide background information on site selection and current viticulture/oenology practices in Nova Scotia.
- Initial work began on developing a Plant Health Lab in collaboration with Agriculture and Agri-Food Canada. The intent is to open the lab in late summer 2018 as a plant diagnostic laboratory specializing in virus detection in grapes. Our team will conduct a systematic sampling procedure in a requested field following a specific protocol that is designed to provide the highest level of confidence in virus detection.
- Perennia, Grape Growers Association of Nova Scotia, Winery Association of Nova Scotia, wineries and grape growers participated in Nova Scotia Community College's Cool Climate - Wine and Viticulture Program Development meetings. This new one-year program will combine theoretical classes with work experience and prepare students to work in vineyards or wine cellars.
- Perennia was also an active member of the Minister's Wine Development Board and its Wine Research and Development Committee

2017/18 was the second year for the Atlantic Tech Transfer Team for Apiculture, which was created at Perennia as a joint initiative supported by government, provincial beekeeper and wild blueberry associations, and wild blueberry processors. This year, research projects included a National Bee Health Survey, a spring miticide efficacy trial, a formic pro efficacy trial and a joint miticide efficacy and resistance trial. In addition, a nosema trial was initiated with four beekeepers from Nova Scotia and New Brunswick. Hives were monitored from each operation before and after blueberry pollination, and were compared to hives that were not sent to blueberry pollination. The efficacy of fumagillin, the only available antibiotic for nosema, was also evaluated in autumn 2017. The team also completed the final report for their study, The Effect of Stocking Density of Lowbush Blueberry Development and Honey Bee Health, which was released in October 2017. The results were presented to the Wild Blueberry Producers Association of Nova Scotia, three Bleuets NB Blueberries twilight meetings, and the Canadian Association of Professional Apiculturists and Canadian Honey Council meetings in Kelowna, BC.



Perennia does many demonstration/adaptive research projects and trials based on industry need that produce information beneficial to the industry as a whole. Some examples of this work included:

- An trial funded by Agriculture and Agri-Food Canada and the Pest Management Centre on the efficacy of Chateau herbicide against moss species in cranberry beds, and the tolerance of cranberry plants to the treatment
- Follow up to haskap pruning trial where bushes were pruned in 2016 at different levels and yield was monitored in 2016 and 2017 to determine if pruning had an effect on berry production. Yields were lower in pruned plants in 2016 but berry size profile was higher. Yields were highest in the plots where 50 per cent of the bushes had been removed in 2017 which suggests that pruning will stimulate fruit bud production for the following year.
- A trial was conducted to determine nitrogen fertility recommendations for newly-planted apple orchards comparing nitrogen fertilizer products, rates, and single versus split applications for optimal tree growth. Funding for this trial was partially provided through the Atlantic Agriculture Research and Innovation Initiative.
- Apple maggot is the most significant insect pest in apples in Nova Scotia causing major losses in some orchards every year (as high as 20-30 per cent). Perennia collaborated with Dr. Suzanne Blatt of Agriculture and Agri-Food Canada on a trial to determine the insecticide efficacy and number of applications for apple maggot management in apples. This trial was undertaken to determine effective control strategies for apple maggot as well as explore if input costs could be reduced.
- Repeated use of post-emergent herbicides is increasingly being implicated in tree decline in apple orchards. By using pre-emergent herbicides in the fall, it is anticipated that the number of seasonal post-emergent applications can be reduced, leading to lower tree mortality. Perennia conducted a trial in the fall of 2017 to test the weed control efficacy of pre-emergent herbicides, and recommendations are now available to growers.
- A number of research trials were undertaken for the onion industry including: onion fusarium basal rot in conjunction with Acadia University to further understand this disease and explore control methods; and onion bacterial rot in conjunction with Dalhousie University and Agriculture and Agri-Food Canada to examine whether nitrogen and sulfur fertility affected the incidence of bacterial rot in onions, and identify the predominant causal organisms of onion bacterial rot.
- A number of research trials were undertaken in sweet potato addressing season extension, spacing, variety evaluations, planting dates and slip origin evaluation.
- Perennia conducted a strawberry nursery chill hour trial in 2017 to determine the effect of chill hours (base 8°C at 4') on plant vigor and yield of northern strawberry nursery plants. The results of the trial were inconclusive, as there are several compounding factors that can affect the yield including, but not limited to, chill hours at the time of digging strawberry plants.

In 2017/18, Perennia created a new Small Farm Outreach position which focused on improving the profitability of Nova Scotia small farms. This position worked closely with our other specialists and industry partners to engage with the small farm community. A key activity was collaborating with the Nova Scotia Department of Agriculture's ThinkFarm Program to organize Nova Scotia's first Small Farm Expos in Antigonish and Lawrencetown. Both events were well attended and the networking was critical to building a collection of small farms wanting to learn more and grow their investments. Additional information and one-on-one support was offered through farm calls, workshops, conferences and tradeshow, as well as active participation on two committees whose work resulted in a loans program established for small farms. Perennia's specialist also attended the Indiana Small Farm Conference and began planning for two workshops in 2018/19 focused on helping farmers gain the skills and knowledge necessary to make their operations year-round income earners.

The Apple Industry Growth and Efficiency Program (AIGEP) is a partnership between the Nova Scotia Department of Agriculture and the Nova Scotia Fruit Growers' Association to assist with the cost of planting high-density orchards. The AIGEP is heading into the fifth year of a six-year program and has already provided \$1,413,877 in funding which supported the planting of 360,294 apple trees on 312.5 acres in the province. Perennia plays a key role on the technical advisory committee by providing input on technical guidelines for new plantings, reviewing planting applications, and helping to coordinate planting inspections.

In response to the fire blight disease outbreak in 2014, local weather data and disease modeling have become powerful decision support tools. Perennia has been collaborating with Agriculture and Agri-Food Canada and Solutions Mesonet to incorporate a functional fire blight prediction model into the publicly-accessible AgWeather Atlantic website. The model was first used in the 2017 growing season, during which Perennia helped validate the model and educate growers. Funding provided by the province to the Association has helped with maintenance of three weather stations in the Annapolis Valley that are key to the monitoring network.

Increasing interest in alternative production systems in both strawberries and caneberries resulted in an investigative trip to Toronto with several berry growers for a workshop in 2017. After attending the workshop on a new production system for high tunnel raspberries and blackberries, there is significant interest in trialing

this system in Nova Scotia in 2018/19 which would result in off-season caneberry production.

Perennia continued to support the Dalhousie University's Atlantic Soil Health Lab Project funded through Agriculture and Agri-Food Canada's Agricultural Greenhouse Gas Program. Specialists facilitated sample collection through partner farms. Seven presentations on soil health, which also highlighted some of the preliminary results from the Dalhousie project, were delivered across the province.



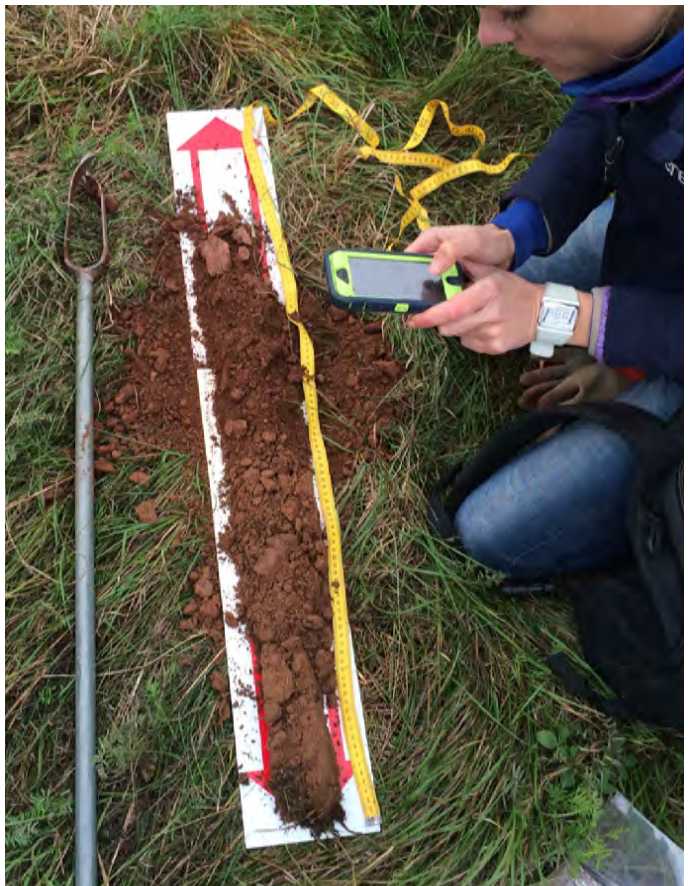
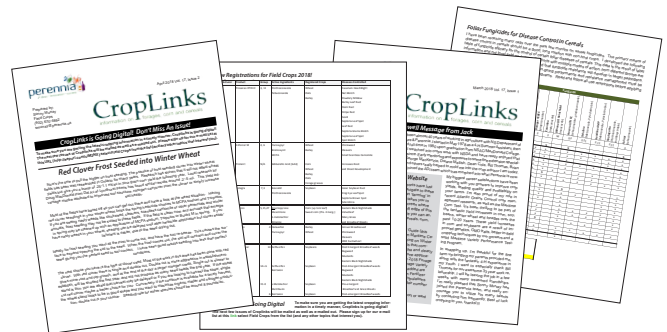
After the successful completion in 2016/17 of the Cape John Community Pasture Project, the Community Pasture Co-op continued to implement rotational and mob grazing in 2017/18. The co-op mob grazed 10 acres in 2017 (and plan to continue this practice) and also replaced the handling corrals at the open pasture. Perennia continued to help with planning and design of the facilities throughout 2017/18.

Perennia is an active participant in the Maritime Beef Council and Maritime Beef Development and Expansion Strategy. The Council worked diligently in 2017/18 to get the development strategy implemented and, as part of that process, held a regional Beef Summit in July. Producer education is a major pillar of the strategy and several other events were undertaken to support this including: a Forage Day at Nappan with Agriculture and Agri-Food Canada; the first component of Beef School with 30 producers attending in September; and the Annual Maritime Beef Conference in March which saw very strong attendance with 400 people on hand for the key note speaker, Dr. Temple Grandin, and 270 producers attending the full conference.

In 2017/18, Perennia partnered with the Maritime Beef Council to conduct the first Atlantic Cow Calf Survey, a survey similar to those conducted in central and western Canada. The survey provided basic production benchmark information that will be used to measure changes in the industry over time and compare our region to the rest of the country. At this time, the plan is to survey the industry again in two years. A similar survey was conducted by the Sheep Producers Association of Nova Scotia in order to get a better understanding of the industry in the province.

In October, Perennia organised a tour of six commercial sheep operations in Ontario for several producers who were planning significant expansions. Since this tour, one of the three had expanded from 30 ewes to 300. The others are working on business plans. In cooperation with Sheep Producers Association of Nova Scotia, Perennia delivered three workshops across the province to improve the knowledge of producers on treating hypothermia and hypoglycemia in new born lambs. There were approximately 80 producers attending the workshops, with several reporting that they had saved lambs because of the knowledge they gained.

In 2017/18, specialists continued to write and distribute the Orchard Outlook newsletter for tree fruit growers (20 issues) and CropLinks for field crop producers (3 issues). We also continued writing The Cultivator column for Farm Focus (8 articles).





SEAFOOD SERVICES

Perennia continued to build its scope of work in the seafood sector in 2017/18. Here is an example of that work.

In summer 2017, Perennia welcomed its first full-time seafood team member when Marilyn O'Neil was seconded from the Nova Scotia Department of Fisheries and Aquaculture. The key focus in 2017/18 was managing several ongoing seafood projects while reaching out to industry to identify new opportunities for innovation, product development and business growth. A number of team members presented at industry-related events and sessions, and held meetings with industry associations regarding seafood-related projects and initiatives. By year's end, initial steps were laid to hire a seafood development specialist to further enhance the team.



In 2017/18, Perennia managed and provided quality and food safety expertise along with the Nova Scotia Department of Fisheries and Aquaculture on a pilot project creating and implementing a quality program for live Nova Scotia lobster shipped to China. This involved managing multiple international partners and one of our food safety specialists travelling to China twice in a six-week period to complete assessments of three China-based seafood businesses with the Nova Scotia Department of Fisheries and Aquaculture and Nova Scotia Business Inc. The work done on this project laid the foundation for a provincial quality lobster program that was introduced by the province at the Minister's Annual Fisheries Conference in February 2017.

Perennia's seafood team began, or continued, work on the following provincially-funded development projects in 2017/18:

- Nova Scotia Branding Project to create and administer a pilot program for approved companies to use Nova Scotia's new seafood logo
- Lobster Automated Grading Project to increase the value of the lobster industry by finding an automated solution to grading which can be incorporated into processing lines, ensuring full meat, vital live lobsters are sold for a premium price
- Catch to Plate lobster onboard handling project to focus on the best handling practices and grading to ensure the highest quality live lobster from Nova Scotia

Perennia continued to be home to the Centre for Marine Applied Research, a project with a steering committee comprised of Perennia, Nova Scotia Department of Fisheries and Aquaculture, the Atlantic Canada Opportunities Agency and Nova Scotia Community College. The current focus of the Centre is the development of the province's aquaculture industry. This year was a building year for the Centre, securing office space at the NSCC Irvy Campus, making application for space at the Centre for Ocean Ventures and Entrepreneurship, adding a Director of Research and a Program Officer, and undertaking a number of initiatives including a sensor deployment project to support oceanographic information collection, and an economic impact study on the aquaculture industry in Nova Scotia.

A key focus in 2017/18 for Perennia was drafting a proposal to be submitted to the Atlantic Fish Fund that would accelerate value added products, quality standards and full utilization to maximize Nova Scotia's valuable seafood resource and increase its global competitiveness. It is expected that the proposal will be submitted early in 2018/19.

A major initiative for Perennia's seafood team this year was the management and co-ordination of the Fisheries and Aquaculture Minister's Conference held in February 2018 in Halifax. The event saw a doubling in attendance and trade show exhibitors from the previous year with close to 400 attendees and 40 exhibitors.

Perennia also attended the World Seafood Congress in Reykjavik, Iceland in 2017 that brought together seafood industry members, importers, private organizations, and government to focus on growth in the blue bio-economy. The conference highlighted practical approaches and cutting-edge research for market innovation, food safety and food integrity.

With the Nova Scotia Aquaculture Association, Perennia provided four training sessions for finfish and shellfish growers using a HACCP-based (Hazard Analysis and Critical Control Points) approach for development and assessment of farm management plans. For our public food safety training courses, 27 per cent of course registrants came from the seafood sector.

Our team at that Innovation Centre has worked with seafood clients on new product development and process improvement, ingredient sourcing, pilot scale drying and smoking, packaging options, bait solutions and shelf-life studies. Work with seafood clients continued in 2017/18 with the team undertaking three seafood-related projects, including providing analytical services to Atlantic Sea Cucumber to conduct nutritional analysis and develop nutritional fact tables for their dried, whole sea cucumber and dried flower products. In addition, discussions were had with 14 other seafood companies on possible projects throughout 2017/18.



QUALITY AND FOOD SAFETY SERVICES

Members of the Quality and Food Safety team work with agri-food and seafood companies to provide the following services: program development, implementation and coaching; assessments; support; and training.

Perennia's Quality and Food Safety Team undertook a total of 21 consulting projects in a variety of sectors including fresh fruits (wild blueberries, sea buck thorn, apples), vegetables (potatoes, leafy greens), dairy (cheese), bakery, dry spices, tea, nut butters, confectionary (chocolate), preserves, seafood and cold storage.

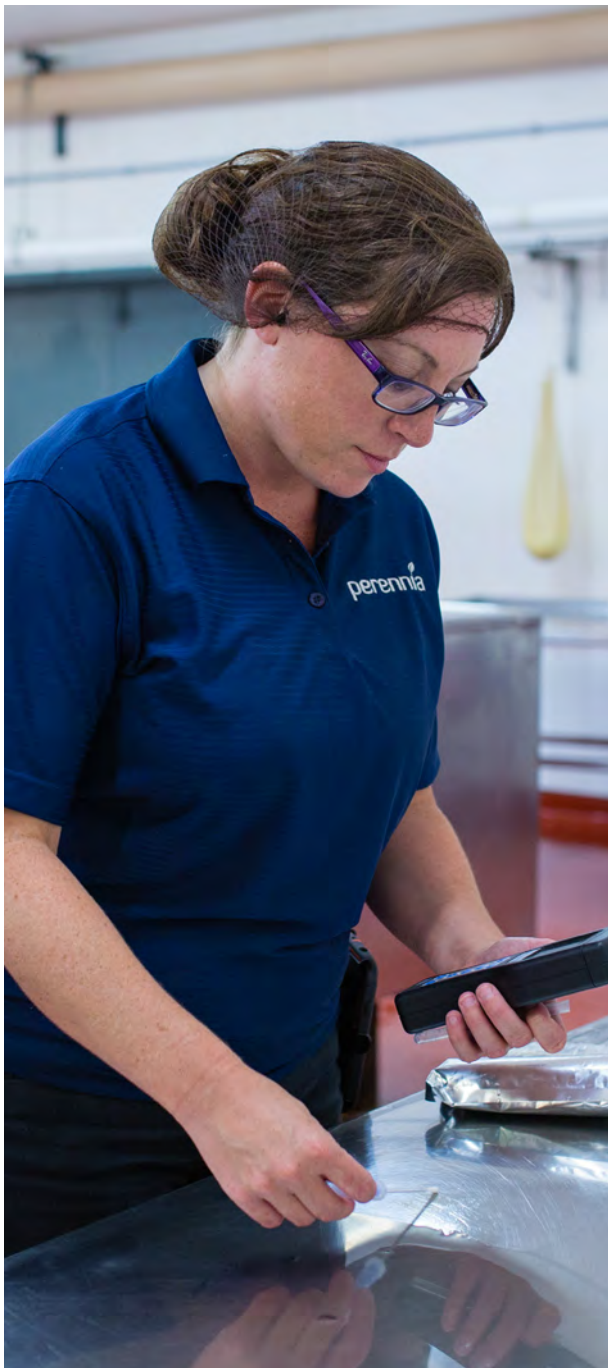
This year, the team continued working with Sobeys as a preferred contractor to audit companies producing low risk products wanting to sell through the retailer.

In July 2017/18, the province's Food Safety Outreach Program moved to Perennia to be completed through March 31, 2018. The program provided subsidized services to ensure safe food from a regulatory and science-based perspective and to support successful market access or market sustainability. Eligible food companies included those which were currently preparing for commercial sale, in the pre-build phase of constructing a processing facility or selling at the farm market level and/ or planning to move into retail distribution, significantly increasing their production or preparing for immediate export. Within this eight month period Perennia received a total of 827 inquiries each with multiple questions and topics. The specialist provided direction on analysis for various parameters on more than 199 food products, provided assistance to hundreds of food processors and producers, and evaluated an estimated 200 food products. Numerous files have involved imports from various countries, and assessment and coordination of file reviews with Canadian Food Inspection Agency and Health Canada in terms of novel foods, natural health products, and novel processes. Export assistance has been provided to various registered and non-registered commodities. Products were discussed and reviewed for all registered commodity types, and a wide range of non-registered food products. The specialist implementing the program was also a lead or participant in various research activities in 2017/18 including a biofilm project with Agriculture and Agri-Food Canada and a kombucha project with Acadia University.



Our e-learning series Food Safety Fundamentals for Food Producers and Processors was launched in 2017/18. This project was supported under the federal/provincial cost-shared Growing Forward 2 program. The sessions provide cost-effective, easy access to the basics of food safety practices and information for beginning, small and medium-sized food entrepreneurs and their teams. All sessions are self-directed and can be done on participants' own time and schedule. The seven sessions are: Introductory Skills for Creating Your Food Safety Program; Premises and Equipment; Personnel, Sanitation, Pest Control, Training; Product Handling, Storage, Purchasing / Approved Supplier; Creating Your Product Specific HACCP Plan; Product Traceability and Recall; and Allergens, Additives and Foreign Material. In 2017/18, 23 courses were purchased by eight people representing four different companies, with extremely positive feedback from attendees about their content, convenience and ease of use. We are "loving the elearning option", said one company manager. "It's cost and time efficient and employee friendly. Very good training and it's nice to be able to send people on courses specific to what they do."

Initially, Nova Scotia's kombucha industry was comprised of small entrepreneurs selling in public markets. Recently, it has grown into a flourishing industry of very uniquely-flavoured products. Processors are presently selling in a large number of retail outlets, and through large retail chains. In 2017/18, Perennia worked with numerous members of the industry to characterize the product, providing quality and food safety analysis to ensure product integrity. In collaboration with Dr. Anthony Tong at Acadia University and a number of kombucha processors, Perennia laid the plans in 2017 for a research project to develop a best practices document to investigate critical controls in product processing ensuring uniformity and validating processes.



This year, our team conducted seven customized food safety training programs for agriculture and seafood companies and associations. In 2017/18, Perennia continued its successful partnership offering NSF-certified public food safety training programs in Atlantic Canada. In total, six training sessions were held with a total of 63 registrants. The food safety specialist who was our main trainer left for a new opportunity in summer 2017. In fall 2017, we began working with NSF International Training and Education to have a new Perennia food safety specialist on-boarded to train some of the NSF courses. In January 2018, Shelly MacDonald completed the on-boarding process and is qualified to train the following NSF courses: Food Safety Fundamentals, HACCP Refresher, HACCP I, HACCP II, Principles of Internal Auditing and Internal Auditing: SQF. The certified courses offered by Perennia/NSF are in-depth and required for staff working in companies certified under many internationally-recognized food safety programs. If Perennia didn't offer them, participants would need to travel to Ontario or a western province to take them.

In 2017, Perennia provided science-based assistance, regulatory input and a literature review to assist a client to develop a unique product for the Nova Scotia marketplace. Known in literature for its healthy influences and exceptional flavour, black garlic is not a well-known product in Nova Scotia and has only one other known processor in the Atlantic provinces. With the development of this value-added product, this new processor will provide Nova Scotia garlic growers access to a totally new niche market. Development of a validation process to document the food safety parameters is in the works for early 2018/19 with the fall harvest set to see a new product in the Nova Scotia marketplace.

In 2017/18, Perennia continued to manage the Catch to Plate lobster quality handling project in conjunction with the Nova Scotia Department of Fisheries and Aquaculture, and were instrumental in a Nova Scotia-China lobster quality standards program which included creation of a manual, appendices and audit checklist and in-person assessments in Nova Scotia and China.

PRODUCT DEVELOPMENT AND COMMERCIALIZATION



All members of the Innovation Centre Team work with agri-food and seafood companies to provide the following services: product and process development, value addition and commercialization, nutritional labelling, laboratory services, regulatory advice, ideation and concept design, and incubating new start-up companies.

The team at the Innovation Center played a leading role in many new product and process development projects this year. The team worked with Halifax Concoctions to extend the shelf life of their beverage product by optimizing the product formulation, package and process. For Pan Pacific Development Co. Ltd., work was undertaken to further develop their high quality powder derived from haskap berries. The Innovation Centre's pilot plant was integral to Blue Pearl Farms to produce a novel certified organic wild blueberry product. And, the team worked with Elderkin's Apples to develop a prototype beverage showcasing the unique varieties of apples they have on their farm.

In 2017, the Perennia Innovation Centre team was approached by Glenmore Farms to develop a wild blueberry purée from its berries. The farm had been contacted to supply the purée for Alexander Keith's historic waterfront brewery in Halifax where it would be incorporated into a newly developed and released Peated Blueberry Ale. With the purée done and delivered to the brewmaster, the beer was featured at Alexander Keith's 222nd birthday celebration on the Halifax waterfront in October 2017. Glenmore Farms then wanted to determine the shelf stability of blueberry purée stored at room temperature as a potential ingredient for various food and beverage manufacturers. The client worked closely with the Innovation Centre team to perfect and validate the processing parameters to ensure a safe and quality product. Through a shelf-life study, and product and process improvements, Perennia Innovation Centre staff determined shelf stability of the farm's blueberry purée for room temperature and refrigerated storage conditions.

In 2017, the team collaborated with Dalhousie University Agricultural Campus and industry partner Dockside Pet Products and Services Inc., a wholly owned subsidiary of Dane Creek Capital Corp., to increase the shelf life and improve the product quality of their freeze-dried capelin treats for dogs and cats through the use of natural preservatives. The desired outcome is an 18-month shelf-stable dried whole capelin with appropriate packaging suitable for entry into the Canadian and US pet treat markets.

Perennia Innovation Centre staff worked closely with Midgard Insect Farms to develop cricket-based pet treat prototypes for the SuperZoo National Pet Show held in Las Vegas in July 2017. The product development team at the Innovation Centre created three new product prototypes for Midgard. The treats included ingredients such as Midgard Farms' whole crickets and cricket meal and locally available rescued fresh food including sweet potato, carrot, cauliflower and blueberries. The developed prototypes were both unique and innovative to the pet treat industry and included Cricket Brittle, Cricket Granola bar pieces and a Take and Bake dry formula that customers can use at their own convenience to bake pet treats at home. The product development performed by Perennia Innovation Center allowed Midgard Farm access to 1000's of top-notch vendors and a means of expanding their market in the rapidly growing pet treat business.

In 2017/18, the team at the Centre worked with Hannah Chisolm, a fourth-year student at St. Francis Xavier University, to help with the product development challenges she was facing in development of a chickpea-based vegan egg replacer. The team at the Innovation Centre advised Hannah on ingredient options to help get the texture, flavour and nutritional profile she was targeting. Hannah was successful in winning the top prize (\$10,000) at 100 Seeds Atlantic Pitch Competition in January 2018, an event created to foster youth entrepreneurship in Atlantic Canada.

This year, Perennia provided industrial technical support to satisfy Health Canada and Canadian Food Inspection Agency requirements. This work included providing nutritional analysis, water activity and pH measurement, microbiology and generation of Canadian Nutritional Fact Tables for Nova Scotia-made products with funding assistance from the Nova Scotia Department of Agriculture for approximately 56 different clients.

The Centre performed shelf life evaluations on numerous products for clients in 2017/18 to ensure products were a good quality and safe for consumption during the period of the claimed product shelf life. Shelf life studies were done using normal storage conditions and/or accelerated modelling. The team also examined the effect of different packaging or use of natural preservatives on some of the products. Shelf life studies performed in 2017/18 included: a two-year shelf life evaluation on seven different haskap berry value-added products; various beverages made from locally sourced berries; an apple cider beverage; a turnip preserve; a wild harvested mushroom ingredient; fresh cut vegetables, such as mixed ready to eat salad mixes and vegetable sticks; a dried fish product and fish sauce; and locally-produced artisanal cured meats.

Under its Industry Research Assistance Program/Contribution to Organization Agreement with the National Research Council, Perennia assisted eight companies in 2017-18 with technical issues. Technical assistance ranged from product development on value addition of natural products and beverages, shelf life using natural preservatives, early stage development of an alternate sugar substitute, and development of new feed.

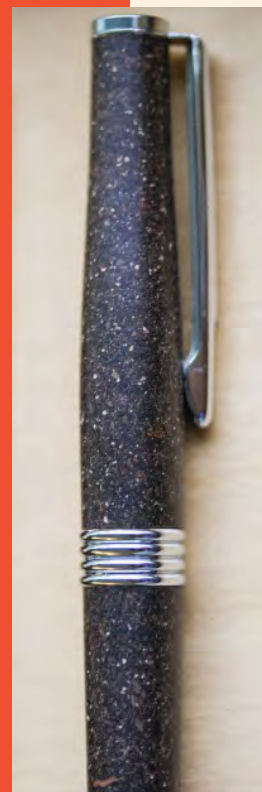
As noted in the Agriculture Services section, Perennia received funding from the Nova Scotia Department of Agriculture to build a mobile bottling line to service Nova Scotia's still wine sector beginning in May of 2018. All of 2017/18 was used to have the trailer fabricated, the equipment installed and for staff training. The unit is capable of offering a full bottling service including

rinsing, filling, capping/corking, capsule dispensing and labelling at speeds of up to 1,500 bottles per hour. This development project will allow the industry to bottle their wine conveniently and in large volumes over short periods of time without the need to invest in their own bottling infrastructure.

In October 2017, Perennia assessed the future needs of the cannabis sector in Nova Scotia with the pending change in federal registration and determined the Innovation Centre had the capacity for an analytical testing lab to service growth in that industry. Resources were put in place to begin the process of applying for a Health Canada license to operate a quality assurance analytical testing facility for cannabis producers. Expectations are that the lab will be in a position to accept its first samples in late 2018.

In 2017/18, the Innovation Centre was home to the following tenants: Agseed Technologies Inc.; Maritime BioExtracts Inc.; Pure Paint; TruLeaf Sustainable Agriculture Ltd.; GoodLeaf Community Farms Ltd.; Midgard Insect Farms Inc.; Oceland Biologicals Ltd.; Cannahort Agriculture Ltd.; and Dockside Pet Products and Services Inc.

AgSeed Technologies (Canada) Inc (AST) was a start-up family business when it established its Research and Development Laboratory at the Perennia Innovation Centre in the fall of 2013. The Centre provided the space and infrastructure necessary for the company owners to pursue their passion: the development of environmentally-responsible technologies and products. The company's work culminated in being awarded the "2017 Innovator of the Year" at the Mobius Awards for Environmental Excellence. AST is now a successful waste-to-value company and a developer of high-value building material products as a solution for diverting waste streams from landfills. With the upcoming commercial launch of their recycled coffee ground-based products, the company will be graduating from the Centre and onto great things!



PERENNIA 2017-18 TEAM

PERENNIA 2017-18 BOARD OF DIRECTORS

Charles Keddy, C.O. Keddy Nursery Inc. (Chair)
Noël Després, Comeau Seafoods Ltd. (Vice Chair)
Dannie Hansen, Louisbourg Seafood
Bill Hay, TruCorp
Victor Oulton, W.G. Oulton and Sons Ltd.
Milton Wood, Oxford Frozen Foods
Réal Samson, Premium Seafoods
Don Downe, retired farmer and politician
Don Sproule, retired farmer and businessman (until June 2017)
Ray Ivany, Acadia University (until June 2017)
Edgar Samson, Premium Seafoods (until September 2017)
Christine Penney, Clearwater Fine Foods Inc. (until December 2017)

PERENNIA 2017-18 TEAM

ADMINISTRATION

Godlien, Lynne - Interim CEO/Director of Marketing and Communications
Pierik, Kyla - Business Development
Arenburg, Helen - Project Assistant
Patti Ryan - Digital Media Specialist (July 2017)
Hutchinson, Ruth Ann - Administrative Assistant, Truro
Lloyd, Wanda - Administrative Assistant, Truro (Innovation Centre)
Walsh, Gail - Administrative Assistant, Kentville

AGRICULTURE SERVICES

Thomas, Bill - Director of Extension/Field Crops Specialist (until July 2017)
Burgess, Peter - Horticulture Crops Specialist (wild blueberries)
Cheverie, Rachael - Horticulture Crops Specialist (cranberries, grapes, greenhouse, vegetable)
Congdon, Caitlin - Research Associate
Diez, Francisco - Viticulture Specialist
Duyvelshoff, Chris (until August 2017) - Horticulture Crops Specialist (tree fruits, tree nuts)
Michelle Cortens (September 2017) - Horticulture Crops Specialist (tree fruits, tree nuts)
Haverstock, Jennifer - Horticulture Crops Specialist (strawberries, high bush blueberries, raspberries)
Leclerc, Mélanie - Research Associate
Madden, Rosalie - Horticulture Crops Specialist (vegetables)

McCallum, Robyn - Apiculturist
McLean, Heather - Non-Ruminant Specialist
Menzies, Cameron (until January 2018) - Apiculturist
Olmstead, Sawyer (February 2018) - Apiculturist
Mosley, Dan - Dairy Specialist
Murray, Gordon (Sonny) (September 2018) - Field Crops Specialist
Sangster, Amy - Soils Specialist
van Roestel, Jack - Field Crops Specialist
Wood, Sarah - Small Farm Outreach Specialist
Wort, Jonathan - Livestock Specialist

SEAFOOD SERVICES

O'Neil, Marilyn - Seafood Development Officer (July 2017)

QUALITY AND FOOD SAFETY SERVICES

Jijena, Marcela - Director of Quality and Food Safety (until September 2017)
Grant, Elaine - Quality and Food Safety Specialist
Harvie, Wendy - Quality and Food Safety Specialist (until June 2017)
Laffin, Pam - Quality and Food Safety Specialist
MacDonald, Shelly - Quality and Food Safety Specialist (July 2017)
Rick Kane - Food Safety Regulatory Specialist (July 2017)

PRODUCT DEVELOPMENT AND COMMERCIALIZATION

Albert, Eric - Chief Science Officer
Anom, Emmanuel - Food Scientist (until November 2017)
Nancy Tregunno - Food Scientist (February 2018)
Boutilier, Erin - Program Administration Officer
Doucet, Craig - Pilot Plant Operator and Building Service Co-ordinator
Gorman, Kim - Wine Bottling Line Operator (March 2018)
Gratton, Marsha - Research and Development Associate
Stephen, Jancy - Laboratory Technician
White, Margot - Product and Process Development Co-ordinator

SPECIAL PROJECTS

Wayne Adams - African Nova Scotia Agri-Projects Co-Ordinator
Balch, Toby - Director of Research, CMAR
Malec, Jennifer - Project Officer, CMAR (January 2018)
Savoie-Swan, Vicki - Managing Director, CMAR



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